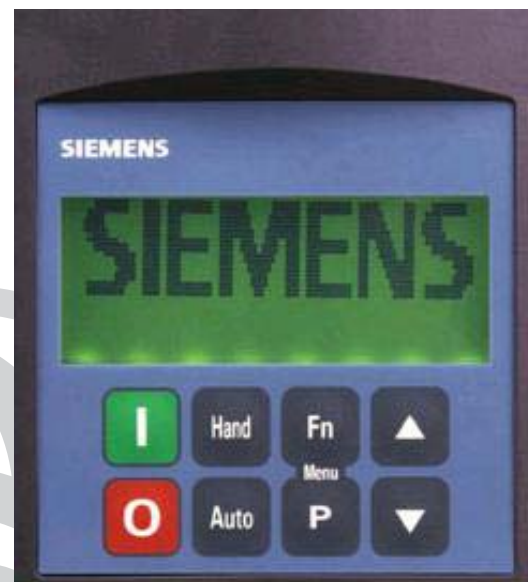


SIEMENS

SED2 Advanced Operator Panel (AOP)

Operating Instructions



SIEMENS

SED2 AOP Operating Instructions

125-3206 Rev. 1, September, 2002

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WARNING

This equipment generates, uses, and can radiate radio frequency energy and if not installed and used in accordance with the instructions manual, may cause interference to radio communications. It has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC rules. These limits are designed to provide reasonable protection against such interference when operated in a commercial environment. Operation of this equipment in a residential area may cause interference in which case users at their own expense will be required to take whatever measures may be required to correct the interference.

SERVICE STATEMENT

Control devices are combined to make a system. Each control device is mechanical in nature and all mechanical components must be regularly serviced to optimize their operation. All Siemens Building Technologies, Inc. branch offices and authorized distributors offer Technical Support Programs that will ensure your continuous, trouble-free system performance.

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TO THE READER

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European Low Voltage Directive

The SED2 VFD product range complies with the requirements of the Low Voltage Directive 73/23/EEC as amended by Directive 98/68/EEC. The units are certified for compliance with the following standards:

EN 60146-1-1 Semiconductor VFDs - General requirements and line commutated VFDs

EN 60204-1 Safety of machinery - Electrical equipment of machine

European Machinery Directive

The SED2 VFD series does not fall under the scope of the Machinery Directive. However, the products have been fully evaluated for compliance with the essential Health & Safety Requirements of the directive when used in a typical machine application. A Declaration of incorporation is available on request.

European EMC Directive

When installed according to the recommendations described in this guide, the SED2 VFD fulfils all requirements of the EMC Directive as defined by the EMC Product Standard for Power Drive Systems EN50082-2.



Underwriters Laboratories

UL and CUL LISTED POWER CONVERSION EQUIPMENT 5B33 for use in a pollution degree 2

ISO 9001

Siemens plc operates a quality management system, which complies with the requirements of ISO 9001.

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How to Use this Manual




The Advanced Operator Panel (AOP) enhances the user interface and communications capability of the SED2 Variable Frequency Drives ("SED2 VFD").

Manual Organization

This manual contains the following sections:

- *How to Use this Manual*, describes the organization of this manual and symbols used throughout this manual.
- *AOP Overview*, shows the AOP main menu and details the AOP function keys.
- *AOP Startup & Initialization*, describes AOP power-on and initialization procedures and discusses using the AOP for single drive control or for control of a network of drives.
- *AOP Applications*, describes different applications of the AOP (controlling just a single SED2 drive or a network of up to 31 SED2 drives).
- *Editing Parameters*, describes how to edit parameters and provides procedures to upload and download a parameter set.
- *AOP Operating Modes*, discusses the AOP operating modes (local, master, or slave) and the functions of the Operate menu.
- *Timer Function*, explains how to use the AOP timer, much like a 7-day, time-of-day, on/off controller.
- *AOP Setup & Configuration*, explains how to customize the AOP via the Setup menu such as screen contrast, large number display, and cursor type.
- *AOP Faults and Warnings*, discusses reporting of AOP fault and warning conditions.

Manual Notations

Notation	Symbol	Meaning
DANGER:		Indicates that personal injury or loss of life may occur if you do not perform a procedure as specified.
WARNING:		Indicates that equipment damage, or loss of data may occur if you do not perform a procedure as specified.
CAUTION:		Indicates that equipment damage, or loss of data may occur if you do not perform a procedure as specified.
NOTES:	(no symbol)	Provides other important information or helpful hints.

Where To Send Comments

Your feedback is important to us. If you have comments about this manual, please submit them to technical.editor@sbt.siemens.com.

Reference Documents

The following SED2 VFD documentation is available from your local Siemens Building Technologies representative:

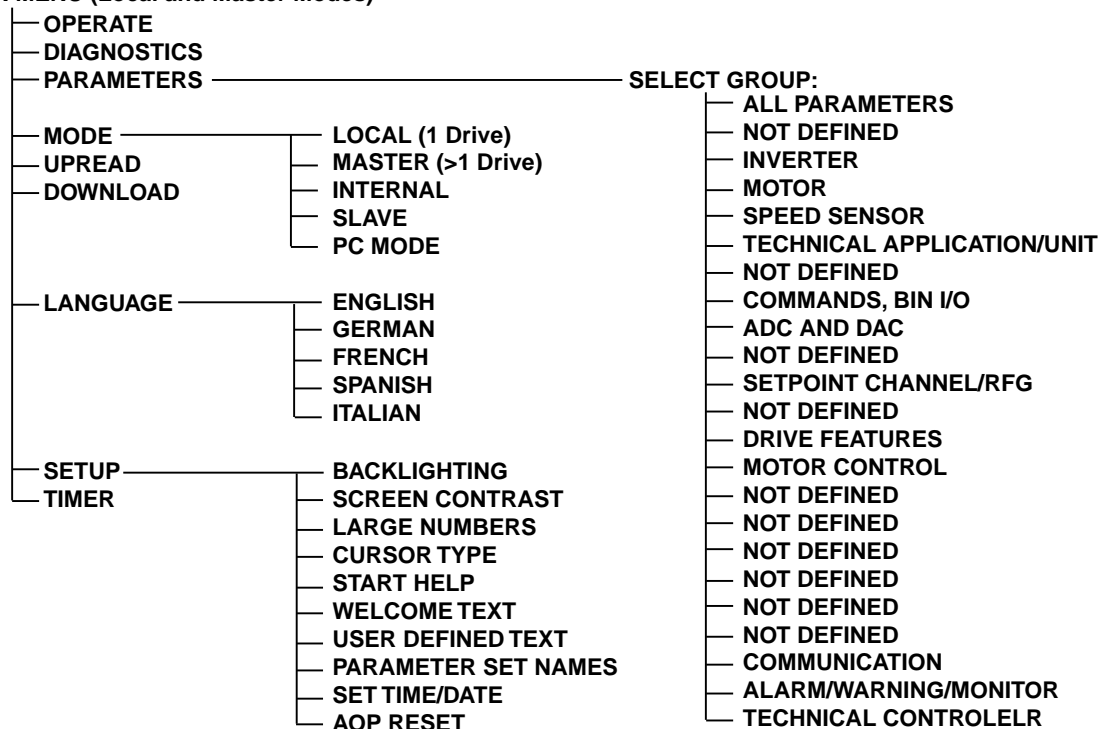
- *SED2 AOP Operation & Maintenance Manual* (125-3202), operating instructions and procedures for the SED2 Variable Frequency Drive (VFD).
- *SED2 VFD Operation & Maintenance Manual Addendum* (125-3205), additional operation and maintenance information for the SED2 VFD such as use of filters and EMC compatibility.
- *SED2 VFD Installation & Startup Guide* (125-3201), a brief guide to operation offers fast access to all basic information necessary to install, set up, commission, and operate a SED2 VFD.
- *SED2 VFD Technical Overview* (153-026P25), a summary of the SED2 VFD product line and accessories, features and functions, and a list of technical data.
- *SED2 VFD Submittal Sheet* (154-042), a two-page synopsis of the SED2 VFD product line, accessories and technical data.
- *SED2 VFD Bypass Options Technical Overview* (153-170P25), a summary of the SED2 VFD Bypass product line, features and functions, and a list of technical data.
- *SED2 VFD Bypass Options Submittal Sheet* (154-044), a two-page synopsis of the SED2 VFD Bypass product line and technical data.

AOP Overview

AOP Menu Structure



















The menus available on the AOP display depend on the currently active operating mode. The following diagram shows the menu structure when the AOP is in either the Local or Master operating mode.






MAIN MENU (Local and Master Modes)



Key Functions

NOTE:  This symbol is used throughout this manual to indicate a special keypad function.

Key/ Function	Functional Description
	<p>Stops the motor.</p> <p>OFF1 Press this button to stop the SED2 within the selected ramp-down time. As part of the factory setting, this function is enabled for manual mode.</p> <p>OFF2 Press this button twice (or once with sustained pressure) to cause the motor to coast freely to a standstill. This function is enabled in the manual and automatic operating modes.</p>
	Starts the motor. As part of the factory setting, this function is enabled for manual mode.
	Places the SED2 VFD in HAND mode.
	Places the SED2 VFD in AUTO mode.
	<p>Increases the display value.</p> <p>During parameterization, this button increases the current value. In manual mode, this button increases the speed (internal motor potentiometer).</p>
	<p>Decrease the display value.</p> <p>During parameterization, this button decreases the current value. In manual mode, this button decreases the speed (internal motor potentiometer).</p>
	Accesses the parameters. Also exits a parameter by accepting its value.
	<p>Error Acknowledgement: When a fault occurs and the SED2 VFD trips, use this button to acknowledge the error.</p> <p>Jump Function: — Press this key (from any parameter, rXXXX or PXXXX) to return to the r0000 display. — Press this key again to return to the previous screen. — Press this key for several seconds to return to the status screen (normal operating mode).</p>
Main Menu	Simultaneously press  and  , at any time, to display the main menu.
Help	Simultaneously press  and  , at any time, to display the relevant help screens.
Delete Parameter Set	While uploading a parameter set, press  and  to delete any previously stored data in that parameter set.
Software Version	While viewing a stored parameter set, press  and  to display the software version of that parameter set.
Scrolling Function	Press  and  to scroll through text on a display consisting of more than four lines.





Key/ Function	Functional Description
Change Single Parameter Digit	<p>Quickly change a single digit of a parameter value as follows:</p> <ol style="list-style-type: none">1. Ensure you are in the parameter value changing level.2. Press  and the right hand digit blinks.3. If desired, press  or  to change the value of this digit.4. Press  again and the next digit blinks.5. Perform steps 3 and 4 until the required value appears.6. Press  to leave the parameter value changing level.

AOP Start-Up & Initialization

Important Notes



CAUTION:

- You can mount or remove the AOP while power is applied to the SED2 VFD.
- You must set Command Source **P0700[1]=4** (USS on BOP link or AOP) before the AOP can start or stop an attached SED2 VFD.
- On setting the AOP as the command source, you must set USS Telegram Off Time for Serial Interface BOP Link **P2014[1]=5000** (5 seconds) to prevent unexpected drive operation. In this mode, removal of the AOP from the SED2 VFD causes a timeout to occur in 5 seconds.
- On setting the AOP as the command source, the drive control buttons (, , , and ) can control the drive at all times.

NOTES:

Parameter editing (bit field indicator) — When editing a bit-field type parameter, the AOP increments the display value as a binary number.

Inhibit — When the AOP displays 'Inhibit', the SED2 VFD is in an inhibit mode of operation as reported by the USS message. This inhibit status clears when the SED2 VFD receives a valid start/stop command from the AOP. On first power-up, send an OFF1 command to the SED2 before trying to run the VFD; this must also be done when the VFD is under Automatic Timer Control.


Power-on and Initialization

1. On initial power-up, the AOP performs internal self tests and displays a welcome screen.
2. After establishing initial AOP-to-SED2 VFD communications, the Start Help screen(s) appear. If the current AOP display language is acceptable, continue with the *Start Help* section. If you need to change the current AOP display language, continue with the *Language Selection* section.

Language Selection

1. The AOP provides the capability to display information in five different languages.

NOTE: Prior to language selection, the AOP has no control over the SED2 VFD.

	<p>CAUTION:</p> <p>Memory Limitation: The delivered AOP supports five European languages: English, German, French, Spanish, and Italian. Due to internal memory limitations, you should delete one of these languages in order to upload the specified ten parameter sets that can be held on the AOP.</p> <p>To Delete a Language: Select Language from the main menu, highlight the language you want to delete, and then press Fn and ▲.</p> <p>NOTE: Once a language has been removed, it cannot be restored.</p>
---	--

Language selection is performed with the AOP online and connected to the SED2. After initial power-up or after a reset and after the AOP performs internal self-tests, the AOP prompts you to select a language.

1. From the main menu, use **▲** and **▼** to scroll through the list of options and to highlight the **Language** item.
Press **P** to confirm the selection. The AOP displays the language selection screen.

2. Use **▲** and **▼** to scroll through and highlight the desired **language**.

Press **P** to confirm the selection. The AOP returns to the main menu.

Start Help

1. On completion of the initial AOP self tests, or if the Start Help feature is ON, then the on-line help screens display.
2. If desired, use **▲** and **▼** to scroll through the help screens.
An arrow on the left-hand side of the screen indicates if more information is available and the direction in which to navigate.

Use **P** to move past the help screens and to go to the main menu.

Quick Commissioning

NOTE: Simultaneously press **Fn** and **P**, at any time, to display the main menu.
The following table describes the main menu items.

Menu Item	Description
Operate	Displays the current status of the SED2 VFD/motor.
Diagnostics	Displays a recent fault history.
Parameters	Allows you to select a parameter group (similar to Parameter Filter P0004) and to configure individual parameters.
Mode	Allows you to select the AOP mode of operation as follows: <ul style="list-style-type: none"> – Local – Master – Internal – Slave – PC Mode
Upread (upload)	Allows you to read a parameter set from a SED2 VFD to the AOP.
Download	Allows you to write a parameter set from the AOP to a SED2 VFD.
Language	Allows you to select a new language for the AOP display.
Setup	Allows you to customize the configuration of the AOP.
Timer	Allows you to set a start and stop time for SED2 VFD operation.

1. Use **▲** and **▼** to scroll through the list of options and to highlight the **Parameters** item.
Press **P** to confirm the selection.

The AOP prompts to select the desired parameter group. Use **▲** and **▼** to scroll through the list of options and to highlight the **All parameters** item. Press **P** to confirm the selection.




NOTE: *AOP Parameters*, provides an overview of parameter access levels and a procedure for editing parameters.




2. Use **▲** and **▼** to scroll through the parameters and to highlight User Access Level **P0003**.
Press **P** to confirm the selection and the cursor advances to the parameter value.







Use **▲** and **▼** to set **P0003=3** (Expert).
Press **P** to confirm the setting and the cursor returns to the parameter.




3. Use **▲** and **▼** to scroll through the parameters and to highlight Commissioning Parameter **P0010**. Press **P** to confirm the selection and the cursor advances to the parameter value.







Use **▲** and **▼** to set **P0010=1** (Quick Commissioning).
Press **P** to confirm the setting and the cursor returns to the parameter.







4. Use  and  to scroll through the parameters and to highlight Command Source **P0700**. Press  to confirm the selection and the cursor advances to the parameter index.




Use  and  to scroll through the indexes for P0700 and to highlight **P0700[1]** (index 1). Press  to confirm the selection and the cursor advances to the parameter value.










Use  and  to set **P0700[1]=4** (USS on BOP/AOP local link). Press  to confirm the setting and the cursor returns to the parameter.
5. Use  and  to scroll through the parameters and to highlight Selection of Frequency Setpoint **P1000**. Press  to confirm the selection and the cursor advances to the parameter index.

Use  and  to scroll through the indexes for P1000 and to highlight **P1000[1]** (index 1). Press  to confirm the selection and the cursor advances to the parameter value.

Use  and  to set **P1000[1]=1** (motor potentiometer [MOP] setpoint). Press  to confirm the setting and the cursor returns to the parameter.
6. Use  and  to scroll through the parameters and to highlight Commissioning parameter **P0010**. Press  to confirm the selection and the cursor advances to the parameter value.

Use  and  to set **P0010[0]=0** (Ready) to exit the quick commissioning mode. Press  to confirm the setting and the cursor returns to the parameter.
7. Use  and  to scroll through the parameters and to highlight USS Telegram Off Time **P2014**. Press  to confirm the selection and the cursor advances to the parameter index.









Use  and  to scroll through the indexes for P2014 and to highlight **P2014[1]** (index 1, Serial Interface BOP Link). Press  to confirm the selection and the cursor advances to the parameter value.

Use  and  to set **P2014[1]=5000** (USS on BOP/AOP local link) to prevent unexpected drive operation. In this mode, removal of the AOP from the SED2 VFD causes a timeout to occur in 5 seconds. Press  to confirm the setting and the cursor returns to the parameter.
8. Press  to return to r0000. Press  to display the standard (operate) screen.
9. Press  to switch the SED2 to hand mode.
10. Press  to start the SED2.
11. Use  to increase the output; Use  to decrease the output.

The AOP display the current status of the SED2 and motor. The following table explains information on this display.

STOPPED		Fn
r0000	F=0.00Hz	▼
I=0.0A	RPM=0	P
M=0%	V=0.0V	▲

Table 1. Status Information of an AOP Display with an Operating SED2.

Data	Description
STOPPED	Indicates the motor connected to the SED2 is <i>not</i> running (pulses disabled).
RUNNING	Indicates the motor connected to the SED2 is running (pulses enabled).
FAULT	Indicates a fault condition has occurred. The SED2 is <i>not</i> running. A fault, described by the AOP under the Diagnostics menu, is preventing operation.
WARNING	The SED2 has detected a problem in normal operation and is informing you of the drive condition.
INHIBIT	A previously occurring fault or OFF condition is preventing SED2 operation. Sending an OFF1 command from the currently active command source clears this condition.
r0000	Indicates a read-only parameter. Drive Display r0000 is the normal operating display.
F= 0.00 Hz	Indicates the frequency at which the SED2 VFD/motor is running.
S= 0.00 Hz	Indicates the speed (frequency) when the motor last stopped.
I= 0.0 A	Indicates the output current.
RPM= 0	Indicates the speed of the motor.
M= 0%	Indicates the current torque of the motor.
V= 0.0 V	Indicates the output voltage.
Vdc= 0.0V	Indicates the dc link voltage.
 and 	Simultaneously press these keys, at any time, to display the main menu.
 and 	Simultaneously press these keys to display the help screens.
	Press P to select the parameter access screen.
 and 	Navigation keys to scroll through information on the display.
	Indicates the direction of the running motor.

AOP Applications

NOTES:

1. If the AOP is the command source for the SED2, set USS Telegram Off Time for Serial Interface BOP Link **P2014[1]=5000** (5 seconds). To do this, first set P0003=3. The P2014[1]=5000 setting causes the drive to trip if communications with the AOP control source is lost.
2. If you have problems connecting to the SED2 drives, set the Auto Baud to OFF and the default baud rate to the same as the SED2.

Single Drive Control Using the AOP

Per default, the AOP is configured to work with only one SED2 in Local mode. In Local mode, the AOP normally mounts directly onto the SED2. The RS-232 and RS-485 ports handle communications. Full operator control of the SED2 is available with access to all normal drive and AOP internal parameters.

To configure a single SED2 VFD with the AOP as the control source, follow the procedure in the *Quick Commissioning* section of this manual.

Network Setup (RS-485 with Panel Mounting Kit)

The AOP has the capability to control up to 31 SED2 VFDs connected as a network. In a network configuration, a unique two-digit number identifies each VFD. When the AOP connects to a network of SED2 VFDs, there are two Master Modes of operation:

- The AOP can access a single SED2 VFD on the network with full control/parameter access
- The AOP can use the *Broadcast mode* to simultaneously start/stop all drives on the network.

Use the following procedure to set up a network of SED2 VFDs under control of an AOP:

1. Use the standard panel mounting kit (PMK) to connect RS-485 communications as follows:
 - a. Correct wiring for PMK and SED2 VFD is as follows:
Pin 3 = +24V
Pin 4 = 0V
Pin 29 and 30 = RS-485 communications
 - b. Use twisted pair cable or shielded cable (preferred).
 - c. The end-of-line SED2 VFD must have a 120-ohm terminating resistor across RS-485 Pins 1 and 2.
 - d. Use a common ground for all SED2 VFDs and the PMK.
 - e. For the first issue of the PMK, for correct communications **DIP Switch 1=UP or ON** on the PMK board.

2. Configure the SED2 VFDs for network use.
 - a. Set the Command Source P0700[1]=5 (USS on Com link). This sets the control over the USS link on the communications port.
 - b. Assign each drive a unique RS-485 USS address in the range of 0 to 30. To do this set User Access Level **P0003=3** (expert) and use USS Address for Serial Interface Com Link **P2011[0]** to assign a unique address to each SED2 VFD.
 - c. If using the AOP as the normal control means for the SED2 VFD, it is recommended that USS Telegram Off Time for Serial Interface BOP Link **P2014[1]=5000**. (To do this, first set User Access Level P0003=3 [expert]). The P2014[1]=5000 setting causes the drive to trip if communications with the AOP control source are lost.
3. With the SED2 VFDs powered-up on the network, connect and power-up the AOP on the PMK.
4. On start-up of the AOP, select **Mode** from the main menu. Press **P** to confirm the selection. On display of the mode menu, select **Master** mode. Press **P** to confirm the selection. Press **Fn** to return to the main menu.
5. Select **Operate** from the main menu. The AOP lists all SED2 VFDs on the network. For each connected SED2 VFD drive, an **O** appears (indicating normal operation).

NOTE: If there is a fault with a connected drive, an **F** appears (indicating a fault condition). Use **▲** and **▼** to select the drive and to clear the fault.

Select a single SED2 VFD and press **P** to confirm the selection or select **B** and press **P** to enter the Broadcast Mode of operation. At any time, **Fn** will exit the Broadcast Mode of operation.
6. Press **I** to start the selected SED2 VFD/motor.
7. Press **0** to stop the selected SED2 VFD/motor.

For more information, see *AOP Operating Modes*.

Network Setup (PC Mode)

The AOP can be configured as an RS-232 to RS-485 converter to allow a PC that is running software to connect to a network of SED2 VFDs.

To use this configuration, use a null modem lead to connect the PC to the PMK. At the AOP main menu, select **Mode**. At the mode menu, select **PC Mode**. Enter the desired **baud rate** of operation.

Editing Parameters

Parameter Access Levels

You can edit SED2 VFD parameters via the AOP. Access levels control access to the SED2 VFD parameters. A higher access level corresponds to a more sophisticated level of control techniques available for the SED2 VFD applications. User Access Level parameter P0003 sets the access level as follows:












- P0003=0 User Defined List
- P0003=1 Standard Parameters
- P0003=2 Extended Parameters
- P0003=3 Expert Parameters

The access level defined for a SED2 VFD (not the AOP) determines the access to the various levels of parameters. Extended level parameters permit access to all Standard level parameters as well as several others. Expert level parameters permit access to all Extended and Standard level parameters, as well as indexed parameters. Parameter indexes provide subsets of a particular parameter function. The indexes group together closely related parameter type information.

Editing Conventional Parameters

NOTE: All parameters that are changed using the following procedures are changing the physical parameters on the SED2 connected to the AOP.

Use the following procedure to change parameters in the SED2 VFD that connects to the AOP.

1. From the main menu, use  and  to scroll through the list of options and to highlight the **Parameters** item.
Press  to confirm the selection.
The AOP displays a parameter screen so you can select the desired parameter group or access level.
2. Use  and  to scroll through the groups/access levels and to highlight the desired parameter group. Press  to confirm the selection.
When you select a parameter group, the AOP displays the first parameter in ascending numerical order.
3. Use  and  to scroll through the list of parameters and to highlight the desired parameter. Press  to confirm the parameter selection and the cursor advances to the parameter value.
4. The AOP displays the values associated with the selected parameter. Use  and  to change the parameter value as desired.

NOTE: The AOP only accepts parameter values within a predefined range. An out-of-range value is rejected and the AOP prompts you to enter a correct value.

5. Press **P** to confirm the new parameter value.
 The AOP returns to the parameter screen so you can select another parameter, if desired.
 Press **Fn** to return to the r0000 display.
 Press **Fn** again to return to the previous menu.
 Press **Fn** for several seconds to return to the status screen (normal operating mode). The parameter value that has been changed is retained within the AOP's internal memory, but not sent to the SED2. Should power to the SED2 or AOP be interrupted, all changes are lost.

TIP: How to quickly change parameter values?

To quickly change a parameter value, use the following procedure to change the single digits of the display:

1. Press **Fn** and the right-hand digit blinks.
2. Press **▲** or **▼** to change the value of this digit.
3. Press **Fn** again and the next digit blinks.
4. Perform Steps 2 and 3 until the desired value displays.
5. Press **P** to exit the parameter value

NOTES:

1. Simultaneously press **Fn** and **P**, at any time, to return to the main menu.
2. Simultaneously press **Fn** and **▼**, at any time, to display the parameter help screens.

Editing Indexed Parameters

Use the following procedure to view and edit parameters with indexes.

1. Make certain you are in the expert access level (P0003=3).
2. From the main menu, use **▲** and **▼** to scroll through the list of options and to highlight the **Parameters** item.
 Press **P** to confirm the selection.
 The AOP displays a parameter screen so you can select the desired parameter group or access level.
3. Use **▲** and **▼** to scroll through the groups/access levels and to highlight the desired parameter group. Press **P** to confirm the selection?
 When you select a parameter group, the AOP displays the first parameter in ascending numerical order.
4. Use **▲** and **▼** to scroll through the list of parameters and to highlight the desired parameter. Press **P** to confirm the parameter selection.
5. Press **P** again to access the parameter index. Use **▲** and **▼** to scroll through the indexes and to highlight the desired index.

6. Press **P** to access the index value. Use **▲** and **▼** to scroll through the index values and to highlight the desired index value.
7. Press **P** to confirm the new index value. The AOP returns to the parameter selection screen so you can select another parameter, if desired.
8. To edit another indexed parameter, repeat Steps 3 to 6.

NOTES:

1. Simultaneously press **Fn** and **P**, at any time, to return to the main menu.
2. Simultaneously press **Fn** and **▼**, at any time, to display the parameter help screens.

AOP Stored Parameter Sets

The AOP contains a battery-backed storage facility for storing up to 10 parameter sets that are identified numerically from 00 to 09.

Only a parameter set containing parameter data can be edited. If the selected parameter set does not contain parameter data, the AOP asks if the default parameter set should be copied to the selected parameter set. When you confirm this request, the AOP copies only the editable parameters to the selected parameter set; read-only parameters are accessed from the original parameter location.

Editing AOP-Stored Parameter Sets

Use the following procedure to edit a parameter set:

1. From the main menu, use **▲** and **▼** to scroll through the list of options and to highlight the **Mode** item. Press **P** to confirm the selection.
The AOP displays a mode menu so you can select the operating mode.
2. Use **▲** and **▼** to scroll through the list of mode options and to highlight the **Internal** item. Press **P** to confirm the selection.
The AOP displays an internal mode menu so you can select the internal mode function.
3. Press **P** again to confirm the selection and to return to the main menu.
4. Use **▲** and **▼** to scroll through the main menu and to highlight the **Parameters** item. Press **P** to confirm the selection.
The AOP displays an internal edit parameter set menu so you can select the desired parameter set.
5. Use **▲** and **▼** to scroll through the list of parameter sets and to highlight the desired **parameter set number**.
You can now edit parameters associated with the selected parameter set.

Editing Internal AOP Parameter Set

1. Set **P0003=3** (expert parameter access level).

2. In the **Internal** mode, scroll through the list of parameter sets until the AOP parameter set appears. Press **P** to confirm the selection.
3. Press **P** again to select **All** parameters.
4. Use **▼** to access the internal AOP parameters. Internal parameters that display AOP information include:

Parameter	Description	Parameter	Description
P0964	Software Version Information	P8562	Free Memory
P8552	Base slave address	P8563	Enable Text Scrolling
P8553	Default baud rate	P8564	RS-232 Error count
P8564	Enable Autobaud	P8565	RS-485 Error count
P8560	Battery level	P8566	Null USS Responses
P8561	Enable Backlight	P8567	USS Timeouts

Parameter Upload (Upread)



CAUTION:

Upload/Download Limitations:

The AOP will normally only upload and download parameters up to and including Level 3. When copying parameter sets between VFDs, you must again complete the quick commissioning to re-adjust the motor parameters. Exit quick commissioning with P3900=3 (for only motor data).

Do not exit quick commissioning with P3900=1 or all downloaded parameters are reset to their default values.

Memory Limitation:

The delivered AOP supports five European languages: English, German, French, Spanish, and Italian. **Due to internal memory limitations, you should delete one of these languages in order to upload the specified ten parameter sets that can be held on the AOP.**

To Delete a Language:

Select Language from the main menu, highlight the language you want to delete, and then press **Fn** and **▲**.

NOTE: Once a language has been removed, it cannot be restored.

The upload/upread procedure reads a parameter set from a SED2 VFD and stores that parameter set in the internal memory of the AOP. The AOP can read from a single SED2 VFD in local mode or from one specific SED2 VFD on a network of SED2 VFDs in master mode.

Use the following procedure to upload/upread a parameter set from a SED2 to the AOP:

1. From the main menu, use ▲ and ▼ to scroll through the list of options and to highlight the **Upread** item.
Press **P** to confirm the selection. Press **Fn** to cancel the upload process.
The AOP displays an upload/upread menu.

NOTE: In master mode, the AOP prompts for selection of a specific SED2 VFD from a list of the networked SED2 VFDs.

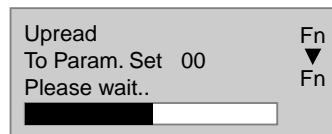
2. Use ▲ and ▼ to scroll through the list of parameter sets and to highlight the parameter set into which information will be written.
Press **P** to confirm the selection.

NOTES:

- If the selected parameter set already contains information, the AOP prompts to clear the existing parameter set.
 - Simultaneously press **Fn** and ▲ when uploading to delete the existing parameter set.
 - When viewing stored parameter sets, press **Fn** and ▲ to display the software version number of the uploaded parameter set.
3. The AOP prompts for confirmation.
Press **P** to confirm the process. Press **Fn** to cancel the upload process.
 4. The AOP displays a wait screen while the upload process occurs.
 5. On completion of the upload process, the AOP returns to the main menu.

Wait Request

Certain tasks that the SED2 performs take longer than other tasks. If this occurs, a screen (such as the following) displays to inform you that the SED2 is completing a task.



Parameter Download

The download procedure writes a parameter set stored in the AOP to any SED2 VFD connected in local mode or to a single specified SED2 VFD on a network of SED2 VFDs connected in master mode. In master mode, the download procedure must select a specific SED2 VFD as the recipient SED2 VFD. (The download cannot simultaneously occur in all networked SED2 VFDs.)

Use the following procedure to download a parameter set:

1. From the main menu, use ▲ and ▼ to scroll through the list of options and to highlight the **Download** item.
Press **P** to confirm the selection. Press **Fn** to cancel the download process.
The AOP displays a download menu.

NOTE: In master mode, the AOP prompts for selection of a specific SED2 VFD from a list of the networked SED2 VFDs.

2. Use ▲ and ▼ to scroll through the list of parameter sets and to highlight the parameter set from which information will be copied.
Press **P** to confirm the selection.
3. The AOP displays a confirmation screen.
Press **P** to confirm the selection. Press **Fn** to cancel the download process.
4. The AOP displays a wait screen while the download process occurs.
5. On completion of the download process, the AOP returns to the main menu.

NOTES:

If the download fails, perform the following:



1. Reset VFD parameters: Commissioning Parameter P0010=30 for factory settings and Factory Reset Parameter P0970=1 to reset all parameters to their default values.
2. Cycle VFD power off/on.
3. Repeat the download process.

AOP Operating Modes

Selecting an Operating Mode

The mode menu allows you to select the desired AOP operating mode. The following table summarizes the AOP operating modes and lists associated main menu items.

Operating Mode	Main Menu Items									Description
	Operate	Diagnostics	Parameters	Mode	Upload	Download	Language	Setup	Timer	
Local	●	●	●	●	●	●	●	●	●	In Local mode, the AOP mounts directly onto one SED2 VFD and then scans its RS-232 and RS-485 ports to establish communications with the first port that answers. You can control the SED2 VFD by accessing all normal SED2 and AOP internal parameters. Local mode is the default of the AOP on initial power-up or after a reset.
Master	●	●	●	●	●	●	●	●	●	In Master mode, the AOP can control up to 31 SED2 VFDs which connect in a multi-drop arrangement. An operator can control each SED2 VFD by accessing all normal SED2 and AOP internal parameters. In Master mode, the network controls the SED2 VFDs either individually or by <i>broadcast</i> operation. A broadcast operation can simultaneously start or stop all networked SED2 VFDs.
Internal		●	●	●			●	●	●	In the Internal mode, you can access the stored parameter sets in an AOP. You can <i>not</i> access any parameter sets stored in the SED2 VFDs. In the Internal mode, the main menu includes an Engineering item. This menu item allows you to view a USS message log of the last 1k bytes of messages between the AOP and the connected SED2 VFDs.
Slave				●						In Slave mode, the AOP communicates with a PC using the AOP Desk Mounting Kit. In this configuration, the AOP acts as a slave to the PC. At the PC, you can upload and access parameter sets or the AOP internal parameter set as a USS address, numbered 1 through 10.
PC Mode				●						In PC mode, the AOP is used with a Panel Mounting Kit to control a network or SED2 VFDs. In this configuration, the AOP acts as an RS-232/RS-485 converter. In PC mode, you can modify only the communications baud rate function.
Upload				●	●		●			

1. At the mode menu, use  and  to scroll through the list of options until the desired operating mode is highlighted.

- Press **P** to confirm the selected operating mode (press **Fn** to return to the main menu.)

NOTE: To exit an operating mode, either follow the on-screen instructions or return to the main menu and select the mode menu to choose a different operating mode.

Operating in Local Mode

On initial power-up or after a reset, the AOP defaults to the Local operating mode. The Local mode operates only with one SED2. You can change the operating mode via the mode menu. You can control the SED2 VFD by accessing all normal SED2 and AOP internal parameters.



Operating in Master Mode (Individual Control of SED2 VFD)

In Master mode, the AOP can control up to 31 SED2 drives that connect in a multi-drop network arrangement. Full operator control of each SED2 is possible with access to all normal SED2 parameters.

Control of the SED2 drives can be individually or by broadcast method.

- In master mode, selecting **Operate** from the main menu displays an operation screen.
- Use **▲** and **▼** to select a slave SED2 VFD. A two-digit number on the left-hand side of the screen identifies each SED2 VFD. In the top, left-hand corner of the screen, an icon indicates the current operating status of the highlighted SED2 VFD. The following table describes the icons.

NOTE: To configure SED2 VFDs for network operation, set Command Source **P0700[1]=5** (USS on Com link), set USS Telegram Off Time for Serial Interface Com Link **P2014[0]=5000**, and USS Address for Serial Interface Com Link **P2011[0]=a unique number** for each drive on the network.

Icon	Description
	Indicates the SED2 VFD is active and communicating.
	Indicates no active slave (icon is blank).
F	Indicates a SED2 VFD fault has been recorded and the SED2 VFD has tripped.
A	Indicates a SED2 VFD with active warnings.
	Indicates a SED2 VFD with communications problems.
p	Indicates a non-SED2 VFD - parameter upload only.

Operating in Master Mode (Broadcast Operation)

In master mode, the network controls the SED2 VFDs either individually or by broadcast operation. A broadcast operation can simultaneously start or stop all networked SED2 VFDs.

While in broadcast operation, note the following AOP functions:

- Since parameters can not be edited globally, **P** does not function in a broadcast operation.
- **▲** and **▼** still function in a broadcast operation. For example, it would be possible to change the speed of a motor simultaneously across all networked SED2 VFDs.
- If a 'Communications Failure' displays, the screen also indicates which slave SED2 VFD is not working correctly. Press **P** to acknowledge the warning condition.

If the warning condition occurs again, the AOP assumes it is not connected to the SED2 VFD and returns you to the main menu.

Communications Failure

If communications between the AOP and a SED2 VFD fails, a warning screen displays. Press **P** to acknowledge the warning condition. If the warning condition occurs again, the AOP assumes it is not connected to the SED2 VFD and returns you to the main menu.

If the AOP fails to establish initial communications with a SED2 VFD, any attempt to select **Operate** from the main menu results in an warning screen. Press **P** to acknowledge the warning condition and to return to the main menu.

Displaying Drive Status

The AOP can monitor the status of its associated SED2 VFD and motor. The screen displays the current activity of the SED2 VFD and motor, including any fault conditions.

Verifying Drive Type

The AOP can verify the type of its associated SED2 VFD. If the SED2 VFD type is incompatible with the AOP, it inhibits operation and returns to the main menu.







Timer Function

NOTES:

1. Before using the timer function as a control method, set the AOP real time clock as described in the *Set Time/Date* section.
2. Setting a timing event for 'every day', configures the same event for each day of the week separately. To clear an 'every day' event, you must clear the event individually from each day.
3. When multiple events must be cleared from the Timer function, it may be easier to reset the AOP as described in the *AOP Reset* section.
4. When in Master mode of operation and viewing the connected SED2 drives, a 'T' displays in the top left corner to indicate that the connected SED2 drives are under timed remote control and may start or stop unexpectedly.

Setting the AOP Timer

When in local or master mode, you can access the timer feature from the main menu. The timer operates as a 7-day, time-of-day, on/off controller (much like a central heating controller but with the addition of a possible multi-VFD selection).

Key	Function
	Moves down through the available choices of the highlighted field.
	Moves up through the available choices of the highlighted field.
	Press this key to confirm a changed field and to move the cursor to the next field. Press this key for several seconds to move the cursor back to the previous field.
	Cancels the entire timer event currently displayed.
0 through 31	Available USS SED2 drive network settings. In Master mode, 0 through 31 are selectable when the AOP detects the SED2 at that address.
B	Allows the programmed timing event to be communicated to all connected SED2 drives (in broadcast mode).
	This is the ON symbol and indicates that the currently viewed or programmed event is when the SED2 drive is switched on.
	This is the OFF symbol and indicates that the currently viewed or programmed event is when the SED2 drive is switched off.

In general, use the following keys to set the timer:

- Press **P** to confirm the input.
 - **▲** and **▼** to scroll through input ranges.
 - Press **Fn** to cancel the input and to return to the previous entry.
1. From the main menu, use **▲** and **▼** to scroll through the list of options and to highlight the **Timer** item.
Press **P** to confirm the selection. The AOP displays the timer screen.
 2. Use **▲** and **▼** to enable (**ON**) or disable (**OFF**) the AOP timer function.

If the timer is enabled, the cursor advances to the day-of-week field. Continue with the next step.
If the timer is disabled, simultaneously press **Fn** and **P** to return to the main menu.
 3. Use **▲** and **▼** to scroll through and highlight the desired **day of the week** (individually Sunday through Saturday, or 'Every Day'). Press **P** to confirm the selection and the cursor advances to the drive selection field.
 4. Use **▲** and **▼** to either input a **drive number** or select '**B**' for broadcast operations. Press **P** to confirm the input and the cursor advances to the time display divider field.
 5. Use **▲** and **▼** to either select a **diamond shape** or a **vertical line** as the time display divider. Press **P** to confirm the selection and the cursor advances to the time of day fields.
 6. Use **▲** and **▼** to increment the **time of day input** in the format **HH:MM:SS**, where HH=Hours (0-23), MM=Minutes (0-59), and SS=Seconds (0-59).
Press **P** to confirm the input.
 7. Simultaneously press **Fn** and **P** to return to the main menu.







AOP Setup & Configuration

Setup Menu

Using the Setup option from the Main Menu of the AOP, you can personalize the following characteristics of the AOP:

- Backlighting
- Screen Contrast
- Large Numbers
- Cursor Type
- Start Help
- Welcome Text
- Parameter Set Names (Expert Level and above only)
- User Defined Text
- Set Time/Date (Service Level only)
- AOP Reset










Use the following procedure to access the Setup menu:

1. From the main menu, use  and  to scroll through the list of options and to highlight the **Setup** item.
Press  to confirm the selection. The AOP displays a setup menu.
2. Use  and  to scroll through the setup menu and to highlight the desired option.
Press  to confirm the selection.




NOTE: Simultaneously press  and  at any time to display relevant help screens.

Backlighting

To activate the backlighting option on the AOP, the following procedure should be performed:







1. Use  and  to highlight the Backlighting option on the setup menu.
Press  to confirm the selection.
The AOP displays a backlighting selection screen.
 2. Use  and  to select either an **OFF** or **ON** backlighting status.
Press  to confirm the selection.
- NOTE:** When you select OFF for no backlighting, the AOP returns to the setup menu.
3. When you select **ON** for backlighting, the AOP displays a backlighting timer screen. The backlighting timer turns off the AOP backlighting after a specified time period of inactivity (in seconds).
Use  and  to select either an **OFF** or **ON** timer function.
Press  to confirm the selection.

NOTE: When you select OFF for the backlighting timer, the AOP returns to the setup menu and the AOP backlighting functions continuously.

4. When you select **ON** for backlighting timer, the AOP displays a backlighting time setting screen.
Use  and  to set the timer period of inactivity (in seconds).
Press  to confirm the setting and the AOP returns to the setup menu.



NOTE: Simultaneously press  and  at any time to display relevant help screens.

Screen Contrast







1. Use  and  to highlight the **Screen Contrast** option on the setup menu.
Press  to confirm the selection.
The AOP displays a contrast screen.
2. Use  and  to adjust the contrast level.
Press  to confirm the selection and the AOP returns to the setup menu.

Large Number Display


You can configure the AOP for a large-number display of the SED2 VFD frequency.

In the Large Number Display mode, you can temporarily switch to normal display mode (4 lines) with the keys  and . After an adjustable time delay, the display switches back to large characters.




Use the following procedure to activate the large number display:




1. Use  and  to highlight the Large Numbers option on the setup menu.
Press  to confirm the selection. The AOP displays a large number screen.
2. Use  and  to select either an **OFF** or **ON** large number display.
Press  to confirm the selection.

NOTE: When you select OFF for no large number display, the AOP returns to the setup menu.

3. Select a requested delay time (4 through 250 seconds).
Press  to confirm the selection and to return to the main menu.

Cursor Type







1. Use  and  to highlight the **Cursor Type** option on the setup menu.
Press  to confirm the selection.
The AOP displays a cursor type screen.

2. Use  and  to select the desired cursor type (blinking underline or inverse-video [default]).
Press  to confirm the selection and the AOP returns to the setup menu.

NOTE: Simultaneously press  and  at any time to display relevant help screens.

Start Help













NOTE: By default, the Start Help function is set ON. To change this setting, select **Start Help** from the setup menu.

1. Use  and  to highlight the **Start Help** option on the setup menu.
Press  to confirm the selection.
The AOP displays a start help screen.
2. Use  and  to select either an **OFF** or **ON** start help function.
Press  to confirm the selection and the AOP returns to the setup menu.

NOTE: Simultaneously press  and  at any time to display relevant help screens.

Welcome Text




Use the following procedure to edit the welcome text that displays on the AOP at power-up:










1. Use  and  to highlight **Welcome Text** option on the setup menu.
Press  to confirm the selection.
The AOP displays a welcome text screen.
2. Use  and  to select an **ON** or **OFF** welcome text status.
Press  to cancel this selection and to return to the setup menu.
Press  to confirm the selection and the AOP displays a text screen with the first character highlighted. The text string can contain a maximum of 20 characters.
3. Use  and  to scroll through the characters until the desired character is shown.
Press  to accept the character and to advance to the next character.
Repeat this step until the desired text is entered.
4. Press and hold  to except the text string and to return to the setup menu.
Press and hold  to cancel the text entry, restore the original text string, and to return to the setup menu.

NOTE: Simultaneously press  and  at any time to display relevant help screens.

User Defined Text

With the following procedure, you can enter a user-defined text in the AOP:

1. Use  and  to highlight **User Defined Text** option on the setup menu.
Press  to confirm the selection.
The AOP displays a user text screen.












2. Use  and  to select an **ON** or **OFF** user text status.
Press  to cancel this selection and to return to the setup menu.
Press  to confirm the selection and the AOP displays a text screen with the first character highlighted. The text string can contain a maximum of 20 characters.
3. Use  and  to scroll through the characters until the desired character is shown.
Press  to accept the character and to advance to the next character.
Repeat this step until the desired text is entered.
4. Press and hold  to except the text string and to return to the setup menu.
Press and hold  to cancel the text entry, restore the original text string, and to return to the setup menu.

NOTE: Simultaneously press  and  at any time to display relevant help screens.

Parameter Set Names







Use the following procedure to edit the names associated with the ten AOP parameter sets.

NOTE: This editing option is not available in the standard access level.

1. Use  and  to highlight the Parameter Set Names option on the setup menu.
Press  to confirm the selection.
The AOP displays a parameter set name screen.
2. Use  and  to scroll through the parameter sets and to highlight the **name** needing editing.
Press  to confirm the selected parameter set name and the AOP highlights the first character.
3. Use  and  to scroll through the characters until the desired character is shown.
Press  to accept the character and to advance to the next character.
Repeat this step until the desired text is entered.
4. Press and hold  to except the text string and to return to the setup menu.
Press and hold  to cancel the text entry, restore the original text string, and to return to the setup menu.

NOTE: Simultaneously press  and  at any time to display relevant help screens.

Set Time/Date

1. Use  and  to highlight the **Set Time/Date** option on the setup menu.
Press  to confirm the selection.
The AOP displays a set time screen and highlights the first time field (hours).
2. Use  and  to scroll through the digits until the desired hour (0-23) displays.
Press  to confirm the entry.
The cursor advances to the next time field (minutes [0-59], and then seconds [0-59]).
Repeat this step until the desired time (hours-minutes-seconds) is set.

3. The AOP displays a set day/date screen and highlights the first field (day of week).
Use ▲ and ▼ to scroll through and highlight the desired day of week.
Press **P** to confirm the entry.
The cursor advances to the first date field (day of month).
4. Use ▲ and ▼ to scroll through the digits until the desired day of the month (01-31) displays.
Press **P** to confirm the entry.
The cursor advances to the next date field (month [01-12], and then year [2000-2250]).
Repeat this step until the desired date (day-month-year) is set.
5. Press and hold the **P** key to accept the Day/Date settings and to return to the setup menu.

AOP Reset



WARNING:

The AOP reset function enables the deletion of all parameter sets and settings, internal faults, and message logs stored in the AOP.

1. Use ▲ and ▼ to highlight the **AOP Reset** option on the setup menu.
Press **P** to confirm the selection.
The AOP displays an AOP reset screen.
2. Use ▲ and ▼ to select ON or OFF to enable or disable the AOP reset function respectively.
Press **P** to confirm the selection.
Press **Fn** to cancel this selection and to return to the setup menu.
3. When you select OFF, the AOP disables the AOP reset function and returns to the setup menu.
When you select ON, the AOP displays the parameter reset screen.
Press **P** to confirm the AOP reset function and to delete all parameter sets, internal faults, and message logs. The AOP then restarts.
Press **Fn** to cancel this selection and to return to the setup menu without deleting any information. The AOP then restarts.

NOTE: Simultaneously press **Fn** and ▼ at any time to display relevant help screens.

AOP Faults & Warnings

NOTE: If a fault/warning condition occurs on a SED2 VFD(s) to which an AOP connects, a fault/warning code displays with a description of the relevant fault/warning. For a list of fault/warning codes, see the *SED2 VFD Operations & Maintenance Manual*, Document No. 125-3202.

Fault Indication/Fault Screen

1. If a fault condition occurs on a connected SED2 VFD(s), the AOP provides a fault message with specific information about the fault condition such as:
 - Identity of the SED2 VFD with the fault condition
 - Fault code number
 - Plain text explanation of the fault condition
2. Proceed by doing one of the following:
 - Press **P** to acknowledge the fault, or
 - Press **Fn** to clear the fault and perform a manual restart of the SED2 VFD. Clearing the fault may depend on the fault condition. It may be necessary to investigate the cause of the fault. Simultaneously press **Fn** and **▲** to display a fault-specific help screen to facilitate diagnosing the fault condition.

NOTE: The AOP can only clear a fault if Command Source P0700[1]=4 (USS on BOP link or AOP).

Warning Indication/Warning Screen

1. If a warning condition occurs on a connected SED2 VFD(s), the AOP provides a warning message with specific information about the warning condition such as:
 - Identity of the VFD with the warning condition
 - Warning code number
 - Plain text explanation of the warning condition
2. There is no requirement for you to acknowledge a warning message. The message displays as long as the SED2 VFD reports the warning condition.

Simultaneously press **Fn** and **▲** to display a warning -specific help screen to facilitate diagnosing the warning condition.

Multiple Faults

If a SED2 VFD or network of VFDs reports more than one fault condition, the AOP displays all fault messages by cycling through them until they are all cleared. See *Fault Indication/Fault Screen* in this chapter to acknowledge each fault message.

Multiple Warnings

If a SED2 VFD or network of SED2 VFDs reports more than one warning condition, the AOP displays all warning messages by cycling through them until the conditions causing the warning messages cease to exist.

Simultaneous Faults and Warnings

If a SED2 VFD or network of VFDs reports a fault condition and a warning condition, the AOP displays all messages by cycling through them. The AOP first displays a fault message and then a warning message separated by a 2-second interval.




This cycle continues until all fault and warning messages display. The cycle repeats itself until all fault messages are either acknowledged or cleared and the conditions causing the warning messages cease to exist.

SED2 VFD Fault/Warning Record P0947






For a VFD that connects to an AOP, the diagnostic menu provides access to recent fault history. In master mode, a two-digit USS slave address identifies each SED2 VFD.

NOTE: Regarding fault history, the AOP time display function is only available if the AOP was connected to the SED2 VFD at the time of the fault.

Use the following procedure to access the AOP diagnostics facilities:

1. From the main menu, use  and  to scroll through the list of options and to highlight the **Diagnostics** item.
Press  to confirm the selection.

2. If no fault history exists, press  or  to return to the main menu.

If fault history exists, use  and  to scroll through the fault history. Simultaneously press  and  to display the help screen which contains details of the relevant corrective action. Press and hold  to return to the main menu.

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